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Effectiviteit van leerkrachtgedrag. Een empirische studie naar leerkrachtgedrag en de samenhang met leerwinst

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SUMMARY.

The effects of schools and teachers on the student's learning are of great interest to educational researchers. This thesis reports on two empirical studies on teacher behaviour in primary education (education for children aged 4 to 12). In the first study, which consists of four case studies, the nature of teacher behaviour is described. The second study, a survey-study, aims to enlarge the body of knowledge concerning the correlation between teacher behaviour and the learning gain obtained by students.

Chapter one presents the theoretical background of both studies. Chapter two describes the case studies, chapter three the survey-study. In chapter four the results are evaluated.

The theoretical background adopts the ecological view of the classroom. On this basis it is assumed that teacher behaviour cannot be properly described and understood in terms of means-ends-models but is guided by teachers' routines. In the cognition of teachers these routines exist as 'scripts' or 'schemata'. These routines are called into action depending on amongst other things how the teacher perceives the classroom. In the literature on planning behaviour and on classroom-management, empirical evidence was found which supports this assumption. In the literature on process-product-research it was found that effective teaching, that is teaching which correlates observably with cognitive growth of students (learning gain), can best be described as active teaching. This is teaching in which the teacher is constantly monitoring and constantly helping groups of students or individual students. The literature on classroom-management also gave rise to the hypothesis that the sequences of behaviour matters. Teachers who ask questions first and then allow students to respond obtain more learning gain than teachers who use the sequence allow response-ask question.

In chapter two four case studies are described. The aim of the case studies was to support the argument 1) that means-ends-models are not suitable for describing teacher behaviour, 2) that teacher behaviour is guided by routines, and 3) to detect types of routines. It was assumed that one can speak of routines in the behaviour of teachers if it was possible to observe the same behaviour repeatedly under similar conditions or even under different conditions and when teachers reported doing things always in the same way. Because teacher behaviour is a function of teacher training and teachers' work experiences, it was expected that routines might become more clearly visible when comparing experienced and less experienced teachers. Two experienced teachers who had worked more than ten years and two less experienced teachers who had worked less than two years in primary education were willing to participate in the case studies. From each of these teachers four arithmetic lessons and

four world-orientation lessons, a subject containing elements of history, geography and science, were video-taped. In a stimulated recall after each lesson the teachers were asked to comment on their behaviour during the lesson. At the end of the video-taped period each teacher was subjected to an in-depth interview in order to get an idea of the planning behaviour of the teacher. Teachers were asked to describe their preparations for the lessons they had taught the day before the interview.

The results show that the teacher behaviour could not be described by means-ends-models. The experienced teachers indicated that, given the curricula they work with, they did not have to do much planning in the subject-fields reading, writing and arithmetic. In fields such as world-orientation, history and geography the amount of planning was moderate. The planning they did involved the content of the lessons, not the way they are to be taught. The less experienced teachers did more planning. They thought about contents and the way contents should be taught. They also said planning became unnecessary once the content had become familiar. The results also show that it is plausible that routines steer teacher behaviour. During lessons the same behaviour has been observed under similar conditions and there appears to be uniformity in the pattern of lessons. Depending on the subject matter the teachers also favoured the same social settings. Seat-work was popular during arithmetic and recitation during world-orientation. In the stimulated recalls the teachers mentioned as their routines:

- the way lessons start
- recalling prior-learning
- monitoring to ensure compliance by students
- asking questions
- coping with differences in learning rate between students
- maintaining classroom rules.

In the course of the case studies a category system was developed in order to study teacher behaviour in the survey study by means of systematic observation. It was argued that, depending on their routines, teachers would score differently on the category system and that there would be differences in the sequence in which entries were made. The category system contained two broad categories, namely one to measure task-related-behaviour and the other off-task-behaviour. The category task-related behaviour comprised ten subcategories, such as: giving instructions, soliciting responses, motivating, criticizing, management-behaviour, directing students and monitoring. The category off-task-behaviour consisted of three subcategories. The behaviour of the four teachers in the case studies was also measured by means of the category system. Entries were made from video-tape. Because the scoring was from video-tape it was possible to obtain an entry for every second the lesson lasted. In contrast to time-sampling in field situations, scoring from video-tape made it possible to distinguish sequences from repetition. The research questions asked were:

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- do experienced teachers use other categories than less experienced teachers.
- can one detect sequences in the appearance of categories.

The first question was answered by means of repeated time-sampling. The two teachers with less than two years of experience were compared to the two teachers with more than ten years of experience. For every teacher the entries within each category during ten consecutive periods of three minutes were determined and these scores were subjected to analysis of variance. The results show that instruction decreases as time progresses. One interaction effect was observed. Experienced teachers use the category instruction less during the beginning of the lessons and more at the end of the lessons when compared to less experienced teachers. Furthermore the experienced teachers used the categories soliciting response and motivating more than the less experienced teachers. These three differences led to the expectation that experienced teachers would obtain more learning gain than less experienced teachers. This was to be tested in the survey study.

Pairs of categories were formed in order to detect sequences in the entries. The results show that most of the pairs are bouts (pairs which consist of the same categories), ranging from 63 to 83%. Apart from the bouts the most frequently observed transitions were: instruction-soliciting response, instruction-monitoring, soliciting response-monitoring, motivating-instruction, motivating-monitoring, listening-motivating, listening-monitoring and monitoring-listening. It also appeared that there were common routines across teachers. Apart from the bouts the most likely behavioral sequences are:

- instruction-monitoring-instruction.
- instruction-soliciting response-listening-motivation.

There also appeared to be great differences between teachers in the degree to which they used the different categories. This means that, given the most likely sequences, teachers differ in the time they tend to use a particular category.

The survey study concentrated on the correlation between teacher behaviour and learning gain in students. Two subjects were included: arithmetic and world-orientation. A total of 109 teachers participated in the survey study, 58 in the field arithmetic and 51 in the field world-orientation. They taught the groups 4, 6 or 8 of the elementary school. This means that they taught children of respectively 7-8, 9-10 and 11-12 years of age. For most of these teachers two lessons were observed in a field situation. The teacher's behaviour was measured twice during each lesson. The first time with a rating-scale which measured the quality of teaching. This instrument consisted of items mainly derived from the literature on classroom-management

research. The internal consistency (coefficient alpha) for arithmetic and world-orientation was respectively .83 and .88. It was predicted that effective teaching correlates positively with learning gain. The second time the teacher behaviour was measured with a category system derived from that developed during the case studies. In the field situation time-sampling was used. Entries were made every five seconds. The category system comprised eight categories: giving instruction, soliciting response, giving directions, criticizing, listening, management behaviour, monitoring and off-task behaviour. The mean Cohen's Kappa between observers was .79. The mean maximum was Kappa .94. Student scores in learning for the different groups and subject matters were obtained with pre- and post-tests developed at the Research Institute for Educational Science (RION) in Groningen. Pre-tests were taken in September, post-tests in May. These tests were internally fairly consistent, the coefficient alpha's ranging from .79 to .86 and from .52 to .68 respectively for arithmetic and world-orientation.

Learning gain was calculated twice, first by subtracting the pre-test score multiplied by the correlation coefficient between pre-test and post-test from the post-test score (regression estimates), second by subtracting the pre-test score from the post-test score (difference scores). The learning gain score for every teacher was the mean of the learning gain scores of the students.

During the case studies it had become clear that sequences could only be correlated meaningfully with learning gain if it was possible to construct long sequences containing different categories. During the survey it appeared that this was not possible. It was decided to drop the question of correlation of sequences and learning gain in the survey study. What was done in the survey study was to compare the results of sequence-analyses with the results obtained from the case studies. The results were similar. Time-sampling led to the same result as observation of real sequences.

The case studies had led to the hypothesis that experienced teachers would obtain more learning gain than less experienced teachers. This hypothesis could not be confirmed. Neither could experience be predicted from the entries on the category system.

As far as the rating-scale is concerned the only significant correlation in the predicted direction between effective teaching and learning gain was found in arithmetic in group 8. The results for group 6 in this subject were puzzling. Had a two-tailed test been used, the result would have been a significant negative correlation. The only explanation which could be found of this result is that one of the curricula used in the survey caused the negative correlation because it requires other teaching behaviour in order to be effective than other curricula in the survey. However, this explanation is highly speculative.

It seemed possible to predict learning gain with multiple-regression-analysis in the field of arithmetic but not in world-orientation. In predicting learning gain for the use of a

category system the system are expressed categories are constant p -variables equals to predict learning P_{ik} , P_{ij} being the being the reference with the model $y =$ constant and the multiple-correlation the variance in learning in the model. With the results show predicted ($r = .83$) soliciting response equation together learning gain is instruction and soliciting management behaviour with listening entered group 8, it holds that when the categories are combined and category giving directions (.68). The same hypothesis entered together with our and monitoring realised that these multicollinearity between

One final remark the category criticism with the regression results of other studies as measured in response. Other results correlations between

category system the entries in a particular category of the system are expressed as a fraction (%) of the total entries. The categories are considered as a set of p-variables. The sum of the p-variables equals 1. For this reason the fractions were not used to predict learning gain but rather the contrasts ($\log p_{ij} - p_{ik}$), p_{ij} being the fraction of category j of subject i, and k being the reference category. Learning gain can then be predicted with the model $y = \alpha + \sum \beta_j (\log (p_{ij} / p_{ik})) + \epsilon$, where α is a constant and the β_j 's are the partial regression weights. The multiple-correlation (mr) between y and \hat{y} indicates which part of the variance in learning gain can be explained by the categories in the model. With off-taskbehaviour as the reference category the results show that in group 4 learning gain can best be predicted (mr .83) when the categories giving instruction and soliciting response are combined and entered in the regression equation together with listening and criticizing. For group 6 learning gain is best predicted when the categories giving instruction and soliciting response are combined, the categories management behaviour and monitoring are combined and together with listening entered in the regression equation (mr .63). For group 8, it holds that learning gain can be predicted reasonably when the categories giving instruction and soliciting response are combined and entered in the regression equation with the category giving directions or listening (mr varying from .58 to .68). The same holds when listening or giving direction are entered together with the combined categories management behaviour and monitoring (mr's varying from .49 to .72). It must be realised that these results may be unstable because of existing multicollinearity between the contrasts.

One final remark is appropriate. In group 4 amongst others the category criticizing correlates positively and significantly with the regression estimates. This is amazing in view of the results of other studies. This anomaly can be explained. Criticizing as measured in this study resembles the giving of corrective response. Other researchers also found positive and significant correlations between this variable and learning gain.